Intel

Intel Xeon Gold 6438N Processor (PK8071305122101)

Datasheet

Product Overview

- The Intel Xeon Gold 6438N is a 4th Gen Intel Xeon Scalable processor for high-density enterprise, cloud, and general-purpose server platforms.
- It provides 32 cores and 64 threads, with a 2.00 GHz base frequency, up to 3.60 GHz Intel Turbo Boost frequency, 60 MB cache, and a 205 W TDP.
- Built on Intel 7 process technology, the processor supports 2S scalability and up to 4 TB of ECC memory.
- It supports DDR5-4800 at 1DPC or DDR5-4400 at 2DPC, with eight memory channels and 80 PCI Express 5.0 lanes for network adapters, storage, and accelerators.
- Intel QuickAssist Technology, Intel Dynamic Load Balancer, Intel DSA, Intel AMX, and Intel DL Boost support selected security, data-movement, analytics, and inference workloads.
- Hardware security features include Intel SGX with Intel SPS, Total Memory Encryption, Boot Guard, Control-Flow Enforcement Technology, and Intel virtualization technologies.

Product Highlights

- **32-Core Server Compute:** 32 cores and 64 threads provide high parallel processing capacity for enterprise servers, cloud infrastructure, virtualization, and general-purpose workloads.
- **2.00 to 3.60 GHz Frequency Range:** The processor combines a 2.00 GHz base frequency with up to 3.60 GHz Intel Turbo Boost frequency for responsive server performance.
- **DDR5-4800 and PCIe 5.0 I/O:** DDR5-4800 at 1DPC, DDR5-4400 at 2DPC, eight memory channels, and 80 PCIe 5.0 lanes support high-throughput server designs.
- **Network and Data-Plane Acceleration:** Intel QuickAssist Technology, Dynamic Load Balancer, and DSA provide documented acceleration resources for selected security, load-balancing, and data-movement operations.

Detailed Features



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Component	Specification
Processor	Intel Xeon Gold 6438N, 32 cores / 64 threads
Ordering Information	PK8071305122101, FC-LGA16A Tray, Spec Code SRMH1
Frequency and Cache	2.00 GHz base, up to 3.60 GHz turbo, 60 MB cache
Memory	Up to 4 TB ECC memory, DDR5-4800 1DPC or DDR5-4400 2DPC, 8 channels

Component	Specification
Power and Expansion	205 W TDP, 2S scalability, PCIe 5.0 with 80 lanes, 16 GT/s UPI, 3 UPI links

32-Core Server Compute

The 6438N combines 32 physical cores with 64 threads, a 2.00 GHz base frequency, and up to 3.60 GHz turbo frequency. Its profile suits enterprise servers, cloud infrastructure, virtualization, and general-purpose workloads.

2S Platform Support

Intel specifies 2S scalability, 16 GT/s UPI, and three UPI links. This supports dual-socket server platforms designed for higher compute capacity and inter-socket bandwidth.

High-Capacity Server Platform

The processor combines a 32-core design, 60 MB cache, 205 W TDP, 80 PCIe 5.0 lanes, and eight memory channels for high-density server deployments.

PCIe 5.0 I/O Expansion

Eighty PCIe 5.0 lanes provide direct expansion capacity for Ethernet adapters, storage controllers, accelerators, and other high-bandwidth server devices.

Flexible ECC Memory Speeds

The processor supports up to 4 TB of ECC memory across eight channels, with DDR5-4800 at 1DPC and DDR5-4400 at 2DPC. This supports server systems with different DIMM population requirements.

High-Bandwidth PCIe 5.0 Connectivity

Eighty PCIe 5.0 lanes provide direct expansion capacity for Ethernet adapters, storage controllers, accelerators, and other high-bandwidth devices. The lane budget supports balanced I/O across a dual-socket platform.

Acceleration for Network and Data Workloads

Intel QuickAssist Technology, Dynamic Load Balancer, and DSA provide documented acceleration resources for selected security, load-balancing, and data-movement operations. Intel AMX and DL Boost support selected AI and inference workloads.

Security and Virtualization Foundation

The processor includes Intel SGX with Intel SPS, Total Memory Encryption, Boot Guard, Control-Flow Enforcement Technology, AES instructions, VT-x, VT-d, and Extended Page Tables. These capabilities help protect workloads and support virtualized server platforms.

Technical Specifications

Product Specifications

Feature	Value
User SKU	INTL-6438N
Intel ordering code	PK8071305122101
Intel Spec Code	SRMH1
Processor model	Intel Xeon Gold 6438N Processor
Product collection	4th Gen Intel Xeon Scalable Processors
Code name	Products formerly Sapphire Rapids
Vertical segment	Server
Processor number	6438N
Lithography	Intel 7
Marketing status	Launched
Launch date	Q1 2023
Embedded Options Available	Yes
Use conditions	Server/Enterprise

Feature	Value
Total cores	32
Total threads	64
Processor base frequency	2.00 GHz
Max turbo frequency	3.60 GHz
Cache	60 MB
Intel UPI speed	16 GT/s
Max UPI links	3
TDP	205 W
Intel DL Boost	Yes
Scalability	2S
Memory types	Up to DDR5-4800 MT/s 1DPC; up to DDR5-4400 MT/s 2DPC
Max memory size	4 TB
Max memory channels	8
ECC memory supported	Yes
PCI Express revision	5.0
Max PCI Express lanes	80
Sockets supported	FCLGA4677
Package carrier	E1B
Package size	77.5 mm x 56.5 mm
DTS max	96 °C
TCASE	85 °C
Intel On Demand Activation Model	No
Intel QuickAssist Technology	2 default devices
Intel Dynamic Load Balancer	2 default devices
Intel Data Streaming Accelerator	1 default device
Intel Advanced Matrix Extensions	Yes
Intel Speed Select Technology - Core Power	Yes
Intel Speed Select Technology - Turbo Frequency	Yes
Intel Speed Select Technology - Performance Profile	Yes
Intel Speed Select Technology - Base Frequency	Yes

Feature	Value
SST-PP Configuration 0	32 active cores, 2.00 GHz base, 205 W TDP
SST-PP Configuration 1	32 active cores, 1.90 GHz base, 205 W TDP
SST-PP Configuration 2	32 active cores, 2.10 GHz base, 205 W TDP
High Priority Cores	12
High Priority Core Frequency	2.20 GHz
Low Priority Cores	20
Low Priority Core Frequency	1.80 GHz
Intel Resource Director Technology	Yes
Intel Speed Shift Technology	Yes
Intel Turbo Boost Technology	2.0
Intel Hyper-Threading Technology	Yes
Intel Transactional Synchronization Extensions	Yes
Intel 64	Yes
Instruction set extensions	Intel AMX, Intel SSE4.2, Intel AVX, Intel AVX2, Intel AVX-512
AVX-512 FMA units	2
Intel QuickAssist Software Acceleration	Yes
Intel Control-Flow Enforcement Technology	Yes
Intel Total Memory Encryption	Yes
Intel AES New Instructions	Yes
Intel Software Guard Extensions	Yes with Intel SPS
Default maximum SGX EPC size	128 GB
Intel Trusted Execution Technology	Yes
Intel OS Guard	Yes
Execute Disable Bit	Yes
Intel Boot Guard	Yes
Intel Platform Firmware Resilience	Yes
Intel Run Sure Technology	Yes
Mode-based Execute Control	Yes
Intel Crypto Acceleration	Yes
Intel Virtualization Technology	VT-x, VT-d, and VT-x with EPT

Feature	Value
Shipping media	Tray
Stepping	S3

Product Comparison

Feature	Intel Xeon Gold 6438N / PK8071305122101	Intel Xeon Gold 6438M / PK8071305122301	Intel Xeon Gold 6438Y+ / PK8071305120701
Processor family	4th Gen Intel Xeon Scalable	4th Gen Intel Xeon Scalable	4th Gen Intel Xeon Scalable
Positioning in this comparison	32-core processor with network and data-plane acceleration	32-core processor with configurable performance profiles	32-core performance-oriented server processor
Total cores	32	32	32
Total threads	64	64	64
Processor base frequency	2.00 GHz	2.20 GHz	2.00 GHz
Max turbo frequency	3.60 GHz	3.90 GHz	4.00 GHz
Cache	60 MB	60 MB	60 MB
TDP	205 W	205 W	205 W
Scalability	2S	2S	2S
Intel UPI	16 GT/s; 3 links	16 GT/s; 3 links	16 GT/s; 3 links
Max memory size	4 TB	4 TB	4 TB
Memory channels	8	8	8
Memory support	DDR5-4800 1DPC; DDR5-4400 2DPC	DDR5-4800 1DPC; DDR5-4400 2DPC	DDR5-4800 1DPC; DDR5-4400 2DPC
ECC memory	Yes	Yes	Yes
PCI Express	5.0, 80 lanes	5.0, 80 lanes	5.0, 80 lanes
Intel SST Performance Profile	Yes	Yes	Yes
Intel AMX	Yes	Yes	Yes
Intel DL Boost	Yes	Yes	Yes
Best-fit role	Network, edge, and communications server workloads	High-capacity enterprise and cloud compute with configurable profiles	High-performance enterprise and cloud compute

Accessories

Category	Accessories
Included Accessories	- Intel Xeon Gold 6438N processor - Tray shipping media
Optional Accessories	- FCLGA4677-compatible server board and CPU heatsink solution - DDR5 ECC memory and PCIe 5.0 network or storage adapters

Support & Warranty

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References

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[2] Intel. (2026). Intel Xeon Gold 6438N Processor Ordering and Spec Information. https://www.intel.com/content/www/us/en/products/sku/232397/intel-xeon-gold-6438n-processor-60m-cache-2-00-ghz/ordering.html